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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

WONG, ERIC TAK WAI

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/781,898	Applicant(s) BOLLAPRAGADA ET AL.	
	Examiner ERIC WONG	Art Unit 3693	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 February 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 and 15-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-13 and 15-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>1/22/2008</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Claims 1-13 and 15-21 are pending.

Information Disclosure Statement

2. The information disclosure statement (IDS) submitted on 1/22/2008 is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner. However, the examiner notes that due to the lengthiness of the references as a whole the examiner has not performed a complete review of the references submitted. The examiner seeks the assistance of the applicant in identifying those references which are pertinent to the claims of the invention.

Response to Arguments

3. The objections to claims 1, 3, 4, 17, 18, and 21 for lack of antecedent basis for the term "the space" are withdrawn since the claims have been amended to provide proper antecedent basis.
4. The rejection of claims 1, 10, 13, 17, 20, and 21 under 35 U.S.C. 112, second paragraph, for the use of the term "substantially" is withdrawn. Examiner notes that one of ordinary skill in the art would understand "generating solutions to substantially cover a space" as similar to solving a linear programming problem.
5. Chakraborty et al. (US Application Publication No. US 2004/0186804 A1) has been disqualified as prior art under 35 U.S.C. 103(a) in light of the showing that the subject matter and the claimed invention were both owned, or subject to an obligation of assignment, to the

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same entity at the time the claimed invention was made. The assignee of the reference is a child company of the assignee of the instant application (see page 10 of Remarks 2/11/2008).

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Examiner's note: Examiner has pointed out particular references contained in the prior art of record in the body of this action for the convenience of the Applicant. Although the specified citations are representative of the teachings in the art and are applied to the specific limitations within the individual claim, other passages and figures may apply. Applicant, in preparing the response, should consider fully the **entire** reference as potentially teaching all or part of the claimed invention, as well as the content of the passage as taught by the prior art or disclosed by the Examiner.

6. Claims 1-13 and 16-21 rejected under 35 U.S.C. 102(e) as being anticipated by Zosin et al. (US Application Publication No. 2004/0181479).

7. Regarding claim 1, Zosin et al. teaches generating an initial population of solutions of portfolio allocations, the generating the initial population of solutions of portfolio allocations including systematically generating the initial population of solutions to substantially cover a space defined by the competing objectives and the plurality of constraints; generating an efficient frontier in the space based on the initial population, the efficient frontier for use in investment decisioning (see paragraphs [0005]-[0007]); and wherein the generating an efficient frontier in the space based on the initial population includes: performing a first multi-objective

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process, based on the initial population and the competing objectives, to generate a first interim efficient frontier; performing a second multi-objective process based on the initial population and the competing objectives, to generate a second interim efficient frontier; and fusing the first interim efficient frontier with the second interim efficient frontier to create an augmented efficient frontier (see paragraph [0057]).

8. Regarding claim 2, Zosin et al. teaches using a combination of linear programming and sequential linear programming algorithms in generating a population of solutions (see paragraph [0011]).

9. Regarding claim 3, Zosin et al. teaches wherein the competing objectives include risk and return and the space is a risk/return objectives space (see paragraph [0007]).

10. Regarding claim 4, Zosin et al. teaches wherein the space is defined by greater than three dimensions (see paragraph [0039]).

11. Regarding claim 5, Zosin et al. teaches wherein the initial population of solutions includes multiple initial feasible points (see paragraph [0011]).

12. Regarding claim 6, Zosin et al. teaches wherein the multiple initial feasible points are generated by solving linear programs (see paragraph [0011]).

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13. Regarding claim 7, Zosin et al. teaches wherein the linear programs utilize randomized parameters. Examiner notes that the assets returns are modeled as random variables (see paragraph [0007]).

14. Regarding claim 8, Zosin et al. teaches wherein the generating the initial population of solutions of portfolio allocations includes generating portfolios with different combinations of risk and returns values (see paragraph [0007]).

15. Regarding claim 9, Zosin et al. teaches wherein the generating portfolios with different combinations of risk and returns values are performed by adding additional risk and return constraints to a linear program corresponding to the risk and return objectives (see paragraph [0039]).

16. Regarding claim 10, Zosin et al. teaches wherein portfolios with substantially all feasible combinations of risk and return values are generated by modifying parameters of the added risk and return constraints (see paragraph [0039]). Examiner notes the reference as teaching "exploring the tradeoffs of the space" and asserts that the teaching reads on "generating substantially all feasible combinations."

17. Regarding claim 11, Zosin et al. teaches wherein the generating the initial population of solutions of portfolio allocations includes generating portfolios with different combinations of competing values (see paragraph [0007]).

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18. Regarding claim 12, Zosin et al. teaches wherein the generating portfolios with different combinations of competing values are performed by adding additional competing value constraints to a linear program corresponding to the objectives of the competing values (see paragraph [0039]).

19. Regarding claim 13, Zosin et al. teaches wherein portfolios with substantially all feasible combinations of the competing values are generated by modifying parameters of the added competing value constraints (see paragraph [0039]).

20. Regarding claim 16, Zosin et al. teaches wherein nonlinear risk and return constraints are approximated with linear constraints generated by a sequential linear programming (see paragraph [0124]).

21. Regarding claim 17, Zosin et al. teaches a population generation portion that generates an initial population of solutions of portfolio allocations, the population generation portion systematically generating the initial population of solutions to substantially cover a space defined by the competing objectives (see paragraphs [0005]–[0007]), the population generation portion including: a range value generation portion for varying values of the competing objectives over a range of each competing objective (see paragraph [0039]); a linear program portion, the linear program portion: solving a linear program, for each of the linear constraints, multiple times by setting a weight vector equal to one of the linear constraints; solving the linear program multiple times by setting the weight vector equal to a randomly generated vector (see paragraph [0124]); the range value generation and the linear program portion: performing a first

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performing a first multi-objective process, based on the initial population and the competing objectives, to generate a first interim efficient frontier; performing a second multi-objective process based on the initial population and the competing objectives, to generate a second interim efficient frontier; and fusing the first interim efficient frontier with the second interim efficient frontier to create an augmented efficient frontier, the augmented frontier being used in investment decisioning (see paragraph [0057]).

22. Regarding claim 18, Zosin et al. teaches wherein the competing objectives include risk and return and the space is a risk/return objectives space (see paragraph [0007]).

23. Regarding claim 19, Zosin et al. teaches wherein the generating the initial population of solutions of portfolio allocations includes generating portfolios with different combinations of competing objectives (see paragraph [0007]).

24. Regarding claim 20, Zosin et al. teaches varying values of competing objectives over a range of each competing objective; solving a linear program multiple times by setting a weight vector equal to one of the linear constraints; and solving the linear program multiple times by setting the weight vector equal to a randomly generated vector (see paragraph [0124]); and iteratively performing the operations until the range of possible values for each competing objective is substantially covered so that an efficient frontier is generated, the efficient frontier being used in investment decisioning; and wherein the generating an efficient frontier includes; performing a first multi-objective process, based on the initial population and the competing objectives, to generate a first interim efficient frontier; performing a second multi-objective process, based on the initial population and the competing objectives, to generate a second

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interim efficient frontier; and fusing the first interim efficient frontier with the second interim efficient frontier to create an augmented efficient frontier (see paragraph [0057]).

25. Regarding claim 21, Zosin et al. teaches generating an initial population of solutions of portfolio allocations, the generating the initial population of solutions of portfolio allocations including systematically generating the initial population of solutions to substantially cover a space defined by the competing objectives and the plurality of constraints; generating an efficient frontier in the space based on the initial population, the efficient frontier for use in investment decisioning (see paragraphs [0005]-[0007]); and wherein the generating an efficient frontier in the space based on the initial population includes: performing a first multi-objective process, based on the initial population and the competing objectives, to generate a first interim efficient frontier; performing a second multi-objective process based on the initial population and the competing objectives, to generate a second interim efficient frontier; and fusing the first interim efficient frontier with the second interim efficient frontier to create an augmented efficient frontier (see paragraph [0057]); wherein the competing objectives include risk and return and the space is a risk/return objectives space); wherein the generating the initial population of solutions of portfolio allocations includes generating portfolios with different combinations of competing objectives (see paragraph [0007]); wherein the generating portfolios with different combinations of risk and returns values are performed by adding additional risk and return constraints to a linear program corresponding to the risk and return objectives (see paragraph [0039]); wherein portfolios with substantially all feasible combinations of risk and return values are generated by modifying parameters of the added risk and return constraints (see paragraph [0039]). Examiner notes the reference as teaching “exploring the tradeoffs of the space” and asserts that the teaching reads on “generating substantially all feasible combinations.”

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

26. Claim 15 rejected under 35 U.S.C. 103(a) as being unpatentable over Zosin et al. in view of Farhang-Merh et al. ("Minimal Sets of Quality Metrics", Book: Evolutionary Multi-Criterion Optimization, January 1, 2003 from the Book Series: Lecture Notes in Computer Science).

27. Regarding claim 15, Zosin et al. does not explicitly teach wherein a dominance filter process is applied on the augmented efficient frontier to create a global efficient frontier.

Farhang-Merh et al. teaches identifying non-dominated sets (NDS) as a set of mutually non-dominated solutions obtained from a multi-objective evolutionary algorithm in order to approximate the Pareto frontier. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to modify Zosin et al. with applying a dominance filter process on the efficient frontier, as taught by Farhang-Merh. One skilled in the art would have been motivated to make the modification for the benefit of having a Pareto efficient or optimal frontier, ie. when one improvement to a factor cannot be made without making another factor worse off.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ERIC WONG whose telephone number is (571)270-3405. The examiner can normally be reached on Monday-Friday 9:00AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, James Kramer can be reached on (571) 272-6783. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you

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would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/James A. Kramer/
Supervisory Patent Examiner, Art Unit 3693

Eric Wong
Examiner
Art Unit 3693

MAR 2008